

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Toyonori SASAKI

Rule 53(b) Continuation of U.S. Application No.
09/280,056

Filed: May 24, 2001

Docket No.: 103007.01

For: INK CARTRIDGE AND REMAINING INK VOLUME DETECTION METHOD

PRELIMINARY AMENDMENT

Director of the U.S. Patent and Trademark Office
Washington, D. C. 20231

Sir:

Prior to initial examination, please amend the above-identified application as follows:

IN THE SPECIFICATION:

Page 6, line 17 - page 7, line 16, delete current paragraph and insert therefor:

When the remaining ink quantity inside the ink cartridge is being detected with a sensor, particularly one that is of the reflected light type, in order to accurately eject light onto a detection site from a light emitting element, and have the light reflected at the inner surface of the outer wall of the ink cartridge, that is the detection site received without failure by a light receiving element, the positions of the light emitting element and light receiving element relative to the detection site must be accurately established. However, the ink cartridge is made so that it can be freely attached to and detached from the recording head so that the user can replace it. The condition in which the ink cartridge is mounted will be slightly different, therefore, every time the user replaces it. In some cases, moreover, variation in the positions

in which the reflected light sensors are attached relative to the carriage will arise at the stage of recording apparatus manufacture. Thus, when there are slight irregularities in the distance between the reflected light sensor and the detection site, or in the attachment position or angle of the reflected light sensor relative to the detection site, the light receiving element cannot properly detect the reflected light, so that the remaining ink quantity inside the ink cartridge cannot be detected or the remaining ink quantity detection precision sharply declines.

Page 45, line 9 - page 46, line 13, delete current paragraph and insert therefor:

In the lower cover member 4 is formed an ink supply hole 17 for supplying ink from the second chamber 10 to the recording head, corresponding to the open face at the lower end of the second chamber 10, and an atmosphere connection hole 18 corresponding to the open face at the lower end of the atmosphere connection path 11. As diagrammed in Fig. 6, the connecting hole 15 and the ink supply hole 17 are positioned so as to be mutually offset as seen from the bottom. In the second chamber 10, a rib-shaped baffle plate 31 is formed across the shortest path connecting the connecting hole 15 and the ink supply hole 17. This baffle plate 31 is made to project integrally from the partitioning wall 7 of the case 2, and it is preferable that it be formed so as to join the inner wall surface of the lower cover member 4, but there is no reason why it cannot be made to project integrally from the lower cover member 4. The lower surface 7d of the bottom partitioning wall 7 (cf. Fig. 3) forms an inclined surface that rises from the lower end of the connecting hole 15 toward the vertical part of the second chamber 10. One end of the baffle plate 31 is positioned at the side of the connecting hole 15, while the other end thereof extends to a point near the vertical part of the second chamber 10. Thus, when ink is drawn from the second chamber 10 by the negative pressure developed by the ejection of ink from the recording head 72, the ink flow coming out of the connecting hole 15 from the first chamber 9 detours around the baffle plate 31, as indicated by the arrow 32, passes through the vertical part 10a of the second chamber 10,

again enters the horizontal part 10b of the second chamber 10, and arrives at the ink supply hole 17.

Page 46, line 14 - page 47, line 11, delete current paragraph and insert therefor:

As diagrammed in Fig. 4, the ink filling hole 13 and the pressure reduction hole 14, after ink filling, are closed off by first sealing materials 21 and 22 applied to the outer surface of the upper cover member 3 by heat welding or the like. The sealing material 22 covers the upper surface thereof so as to secure the path 16. The ink supply hole 17 and the atmosphere connection hole 18 are closed off by a second sealing material 23 that is applied by heat welding or the like such that it can be peeled away. The ink filling hole 13 and the ink supply hole 17 are separated, wherefore the second sealing material 23 is applied to the ink supply hole 17 prior to ink filling. For this reason, the periphery of the ink supply hole 17 is not wet by ink during filling as with a conventional ink supply hole that doubles as the ink filling hole, wherefore an adequate sealing effect can be obtained even with mild heat welding such as will not deform the ink supply hole. The sealing materials 21 and 22 do not need to be peeled away, wherefore they may be heat welded more strongly even to the point of slightly deforming the upper cover member 3. The sealing materials 21, 22, and 23 are made of a resin, metal foil, or laminated material thereof that is not penetrable by air.

REMARKS

Claim 1 is pending. By this Preliminary Amendment, the specification has been amended to correct minor informalities in the specification. Prompt and favorable examination is respectfully requested.

The attached Appendix includes marked-up copies of each rewritten paragraph (37 C.F.R. 1.121(b)(iii)).

Should the Examiner have any questions or comments on this matter, the Examiner is requested to contact the undersigned at the telephone number listed below.

Respectfully submitted,



James A. Oliff
Registration No. 27,075

Scott M. Schulte
Registration No. 44,325

JAO:SMS/sxb

Attachment:
Appendix

Date: May 24, 2001

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P.O. Box 19928
Alexandria, Virginia 22320
Telephone: (703) 836-6400

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APPENDIX

Changes to Specification:

The following are a marked-up versions of the amended paragraphs:

Page 6, line 17 - page 7, line 16:

When the remaining ink quantity inside the ink cartridge is being detected with a sensor, particularly one that is of the reflected light type, in order to accurately eject light onto a detection site from a light emitting element, and have the light reflected at the inner surface of the outer wall of the ink cartridge, that is the detection site received without ~~fail~~failure by a light receiving element, the positions of the light emitting element and light receiving element relative to the detection site must be accurately established. However, the ink cartridge is made so that it can be freely attached to and detached from the recording head so that the user can replace it. The condition in which the ink cartridge is mounted will be slightly different, therefore, every time the user replaces it. In some cases, moreover, variation in the positions in which the reflected light sensors are attached relative to the carriage will arise at the stage of recording apparatus manufacture. Thus, when there are slight irregularities in the distance between the reflected light sensor and the detection site, or in the attachment position or angle of the reflected light sensor relative to the detection site, the light receiving element cannot properly detect the reflected light, so that the remaining ink quantity inside the ink cartridge cannot be detected or the remaining ink quantity detection precision sharply declines.

Page 45, line 9 - page 46, line 13:

In the lower cover member 4 is formed an ink supply hole 17 for supplying ink from the second chamber 10 to the recording head, corresponding to the open face at the lower end of the second chamber 10, and an atmosphere connection hole ~~17~~18 corresponding to the open face at the lower end of the atmosphere connection path 11. As diagrammed in Fig. 6,

the connecting hole 15 and the ink supply hole 17 are positioned so as to be mutually offset as seen from the bottom. In the second chamber 10, a rib-shaped baffle plate 31 is formed across the shortest path connecting the connecting hole 15 and the ink supply hole 17. This baffle plate 31 is made to project integrally from the partitioning wall 7 of the case 2, and it is preferable that it be formed so as to join the inner wall surface of the lower cover member 4, but there is no reason why it cannot be made to project integrally from the lower cover member 4. The lower surface 7d of the bottom partitioning wall 7 (cf. Fig. 3) forms an inclined surface that rises from the lower end of the connecting hole 15 toward the vertical part of the second chamber 10. One end of the baffle plate 31 is positioned at the side of the connecting hole 15, while the other end thereof extends to a point near the vertical part of the second chamber 10. Thus, when ink is drawn from the second chamber 10 by the negative pressure developed by the ejection of ink from the recording head 72, the ink flow coming out of the connecting hole 15 from the first chamber 9 detours around the baffle plate 31, as indicated by the arrow ~~31~~ 32, passes through the vertical part 10a of the second chamber 10, again enters the horizontal part 10b of the second chamber 10, and arrives at the ink supply hole 17.

Page 46, line 14 - page 47, line 11:

As diagrammed in Fig. 4, the ink filling hole 13 and the pressure reduction hole 14, after ink filling, are closed off by first sealing materials 21 and 22 applied to the outer surface of the upper cover member 3 by heat welding or the like. ~~It~~ The sealing material 22 covers the upper surface thereof so as to secure the path 16. The ink supply hole 17 and the atmosphere connection hole 18 are closed off by a second sealing material 23 that is applied by heat welding or the like such that it can be peeled away. The ink filling hole 13 and the ink supply hole 17 are separated, wherefore the second sealing material 23 is applied to the ink supply hole 17 prior to ink filling. For this reason, the periphery of the ink supply hole 17

is not wet by ink during filling as with a conventional ink supply hole that doubles as the ink filling hole, wherefore an adequate sealing effect can be obtained even with mild heat welding such as will not deform the ink supply hole. The sealing materials 21 and 22 do not need to be peeled away, wherefore they may be heat welded more strongly even to the point of slightly deforming the upper cover member 3. The sealing materials 21, 22, and 23 are made of a resin, metal foil, or laminated material thereof that is not penetrable by air.

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LETTER TO THE OFFICIAL DRAFTSPERSON

Director of the U.S. Patent and Trademark Office
Washington, D.C. 20231

Sir:

Please substitute the attached 4 sheets of formal drawings depicting Figures 2, 3, 6
and 20 for the corresponding drawings filed with the application.

Respectfully submitted,



James A. Oliff
Registration No. 27,075

Scott M. Schulte
Registration No. 44,325

JAO:SMS/sxb

Date: May 24, 2001

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Fig. 2

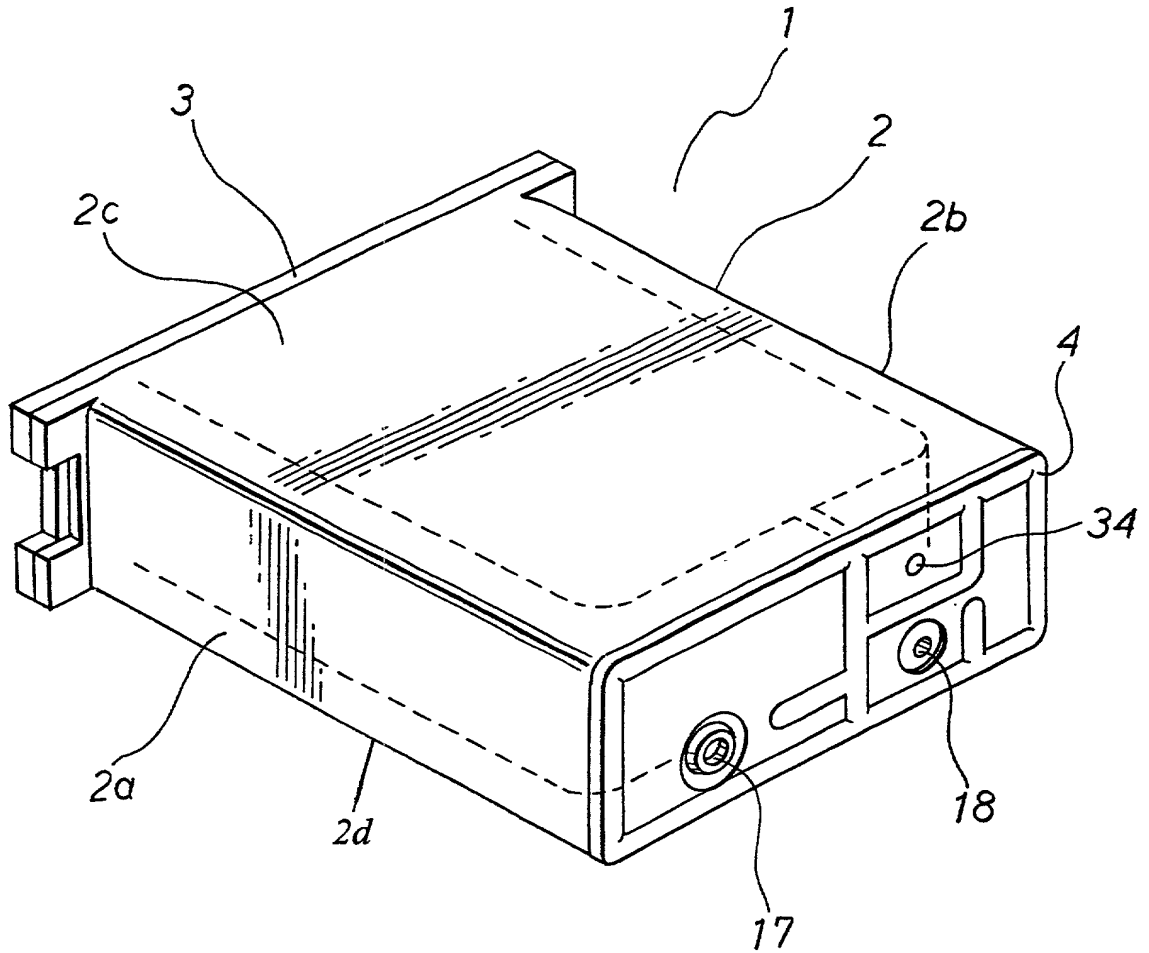


Fig. 3

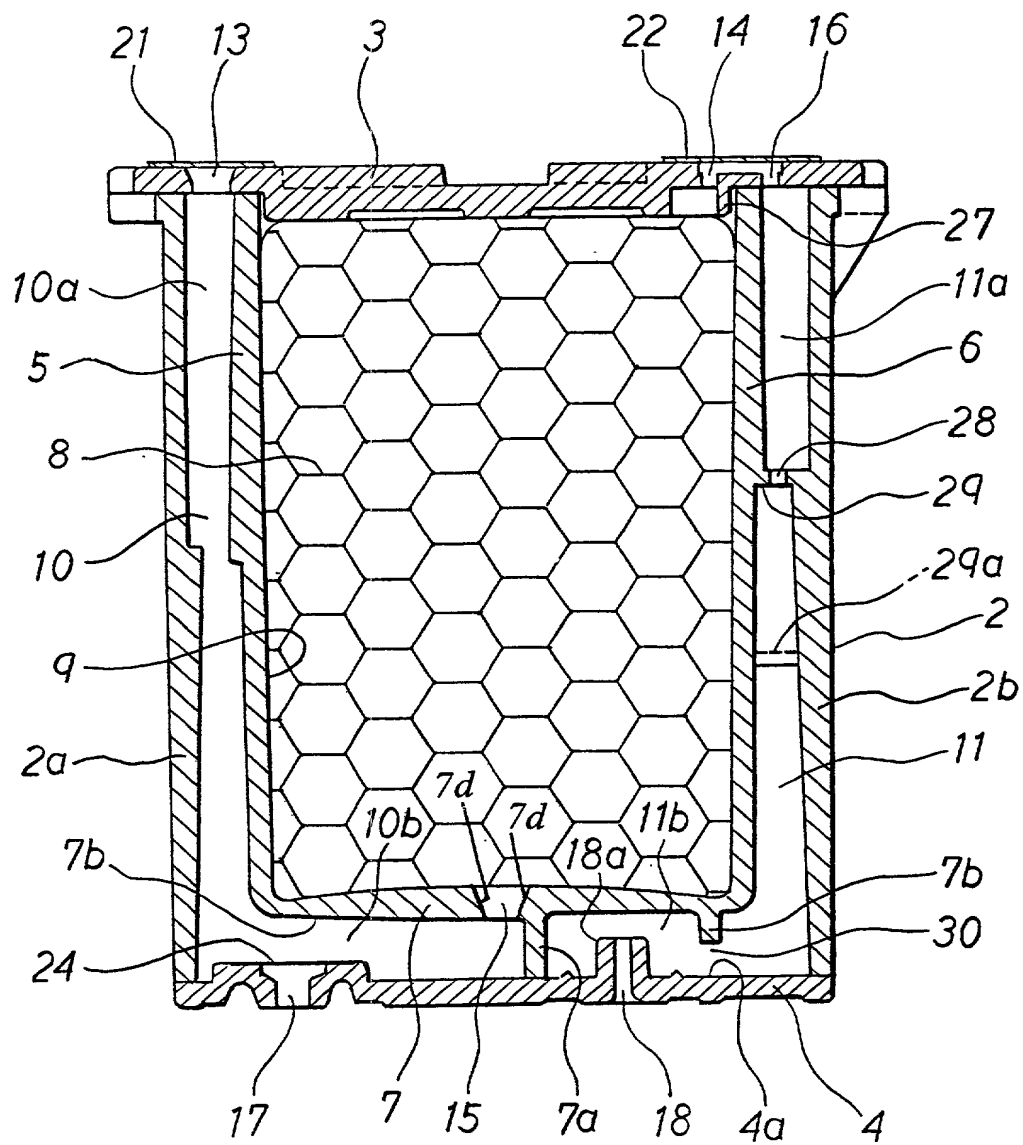


Fig. 5

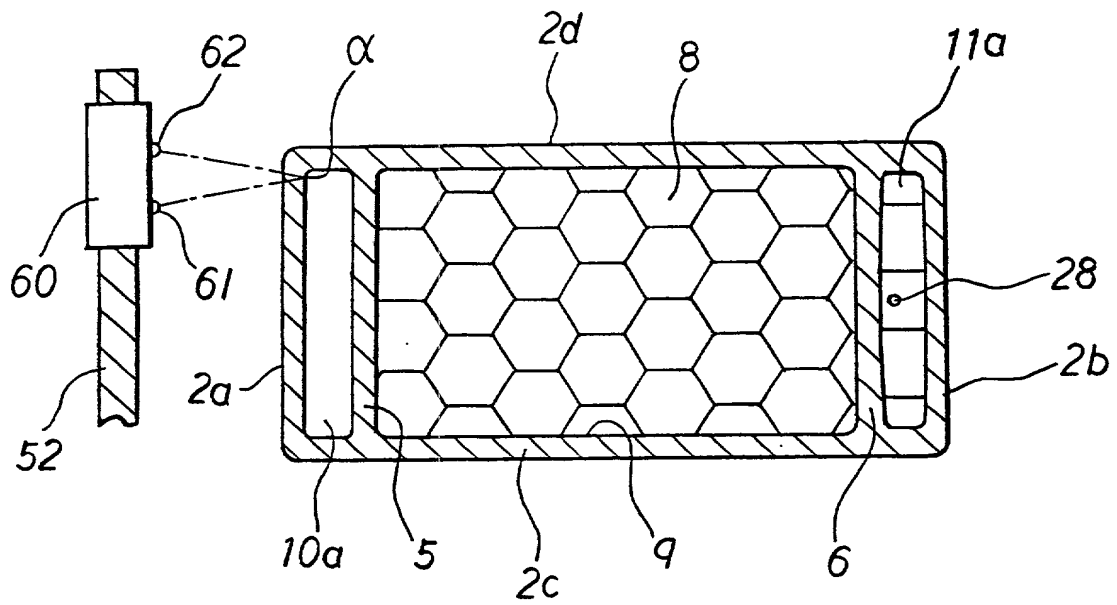


Fig. 6

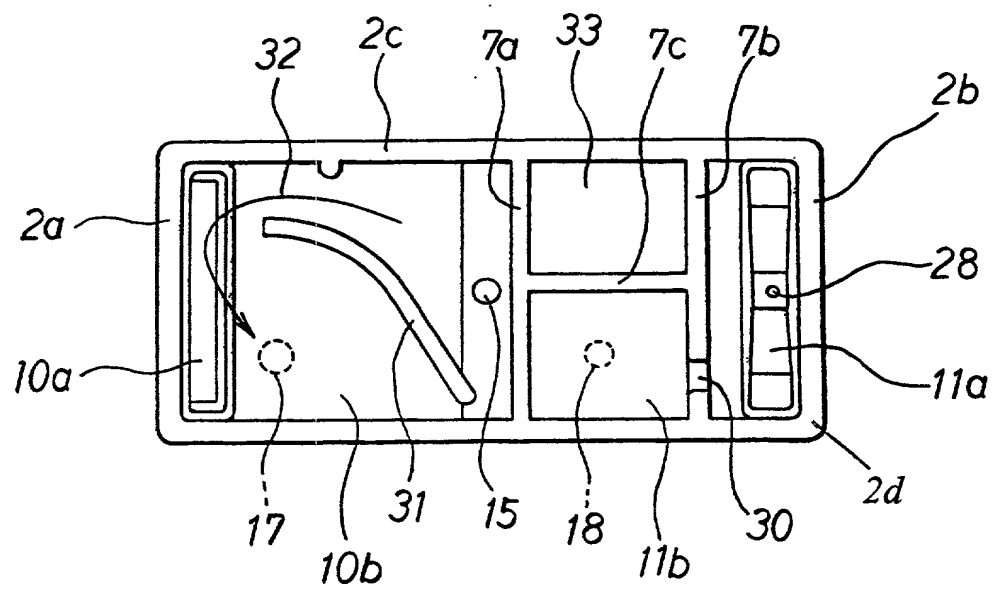


Fig. 20

